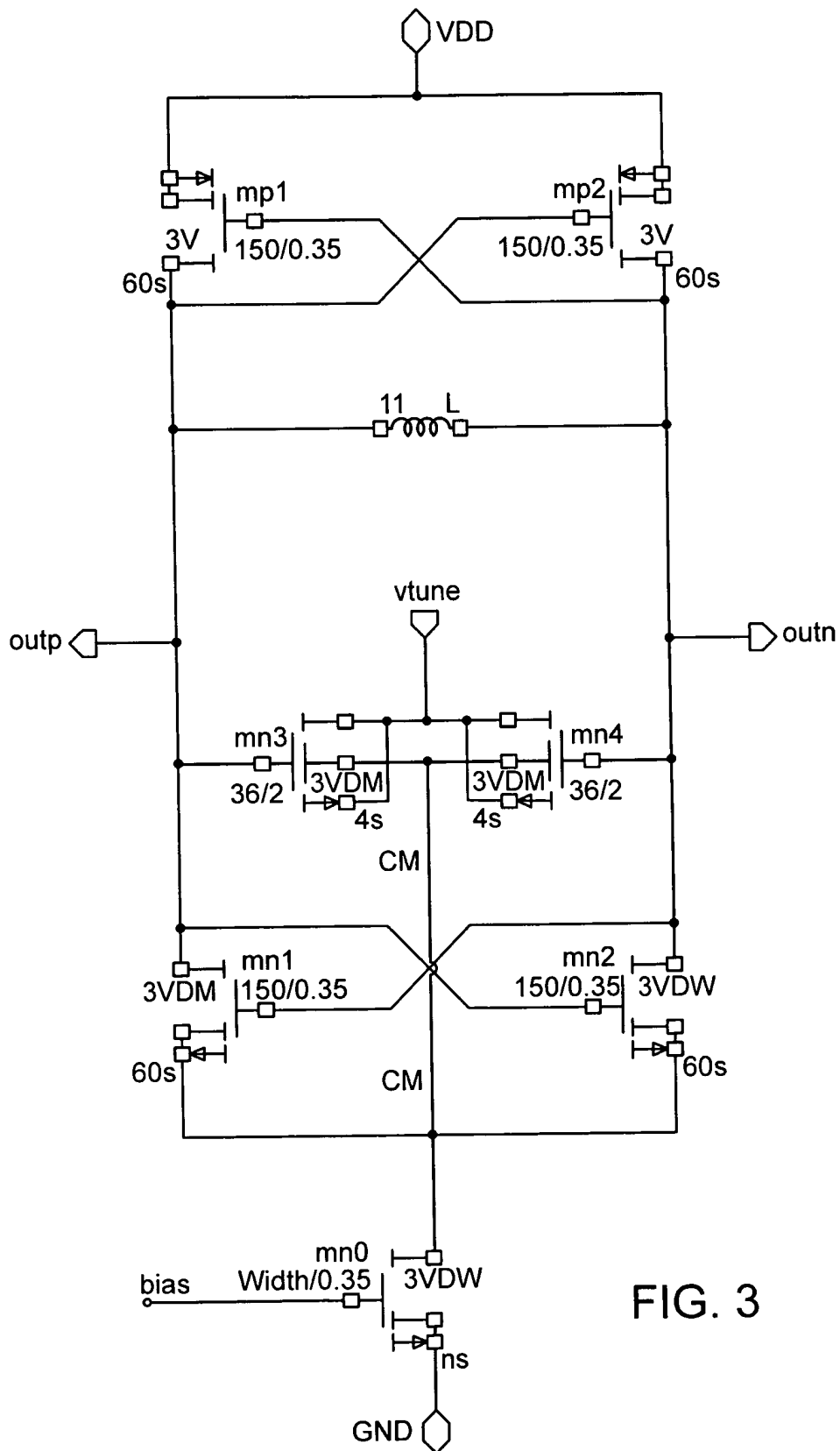


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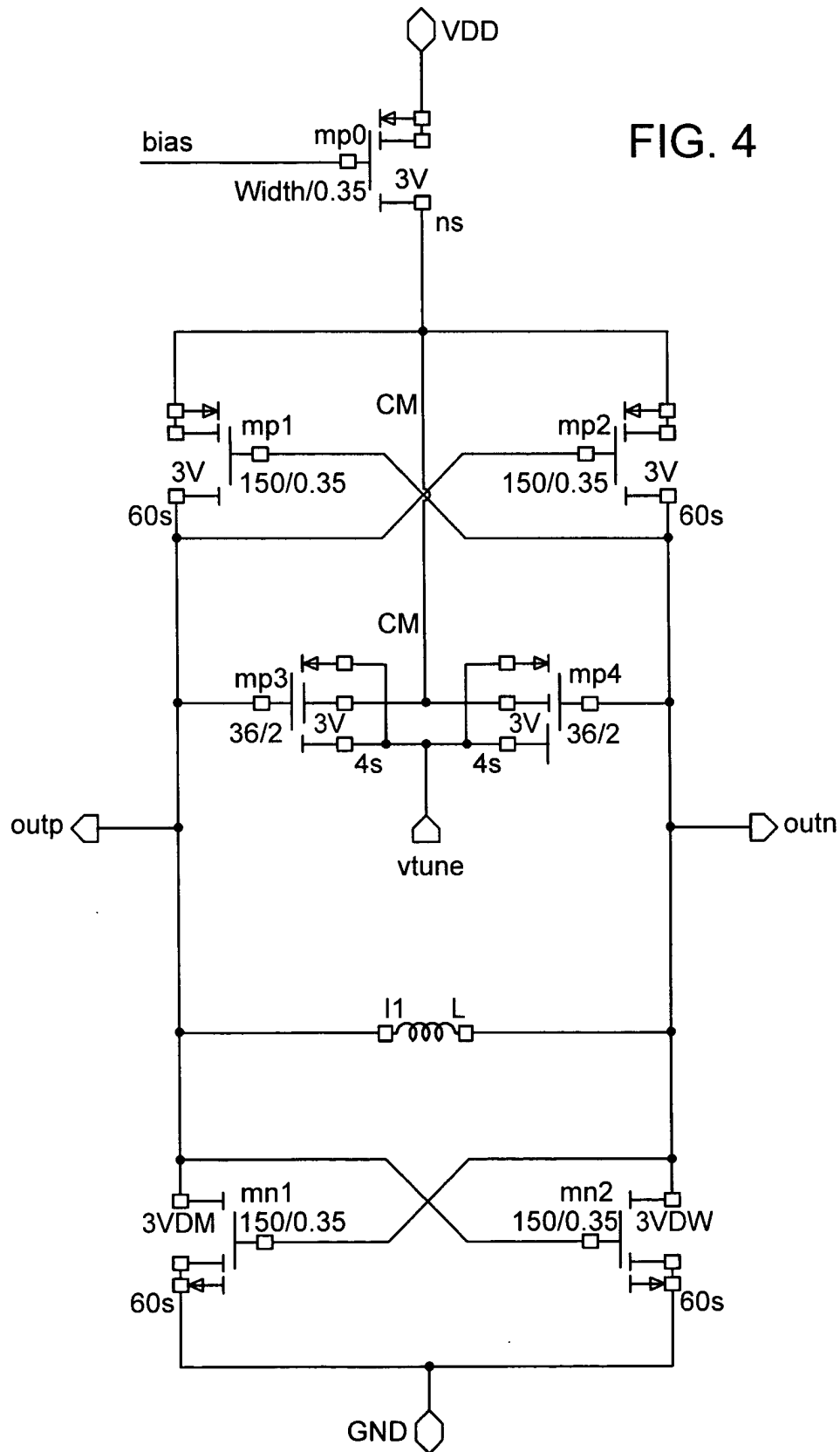
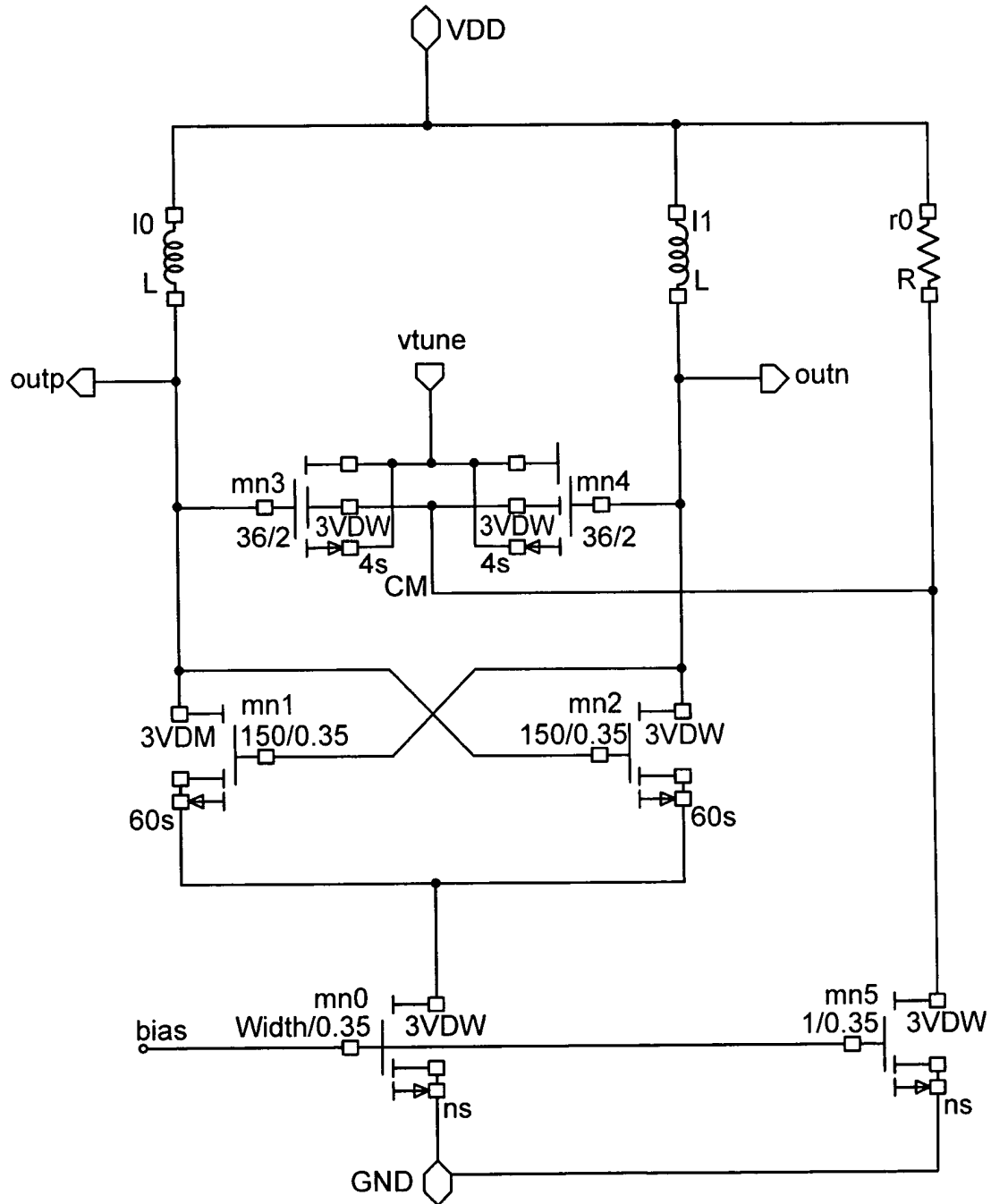


FIG. 5



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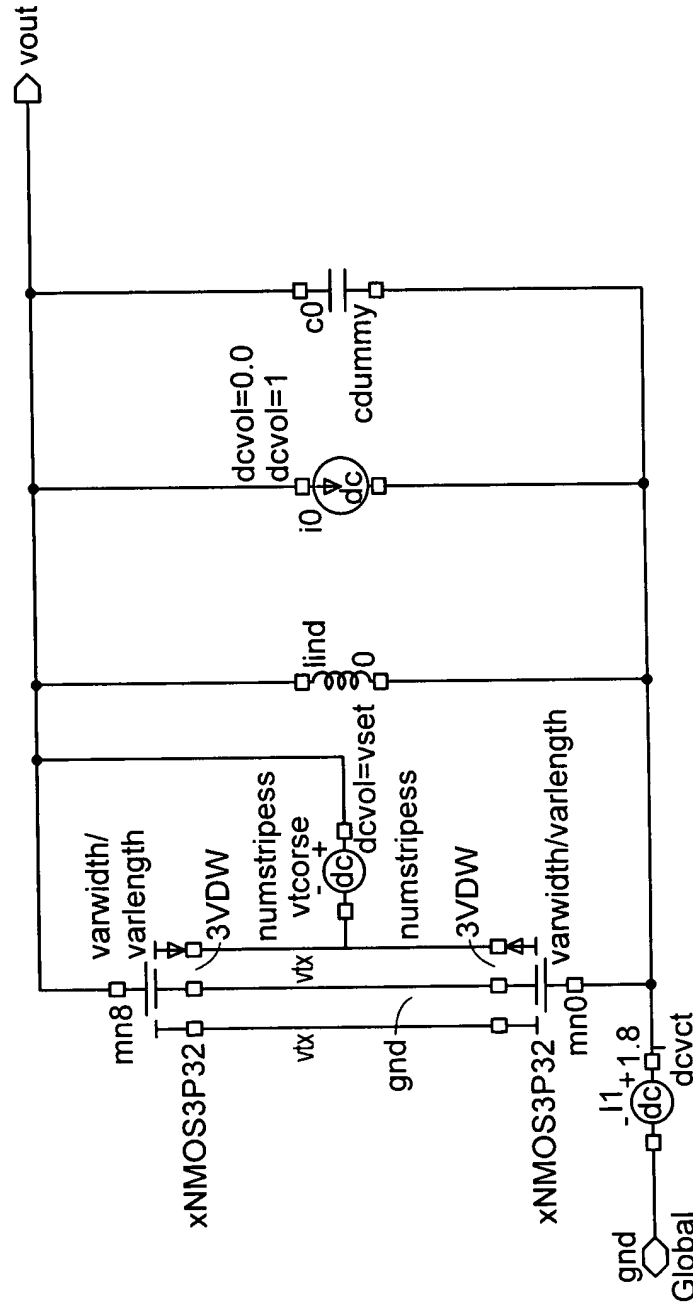


FIG. 6

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Calculate small swing tuning range, varactor Q, C(V) for D=S BG=GND, I-NMOS
36.00Wx2. 00L, 4s, 1 NMOS varactor, ideal 0.36nH inductor tank

Process: nominal Temp: 25.0 deg C

Min Vtune: 1.8V Fc: 7.763 GHz VarQ: 272.8 Ztank: 4739.49 Ohms - 1630 MHz/V

Max Vtune: -2.00V Fc: 10.453 GHz VarQ: 1830.4 Ztank: 44099.77 Ohms 11 Mhz/V

Tuning Range: 2690.29 MHz 29.54 % about Favg: 9.108 GHz GainRatio: -146.6:1

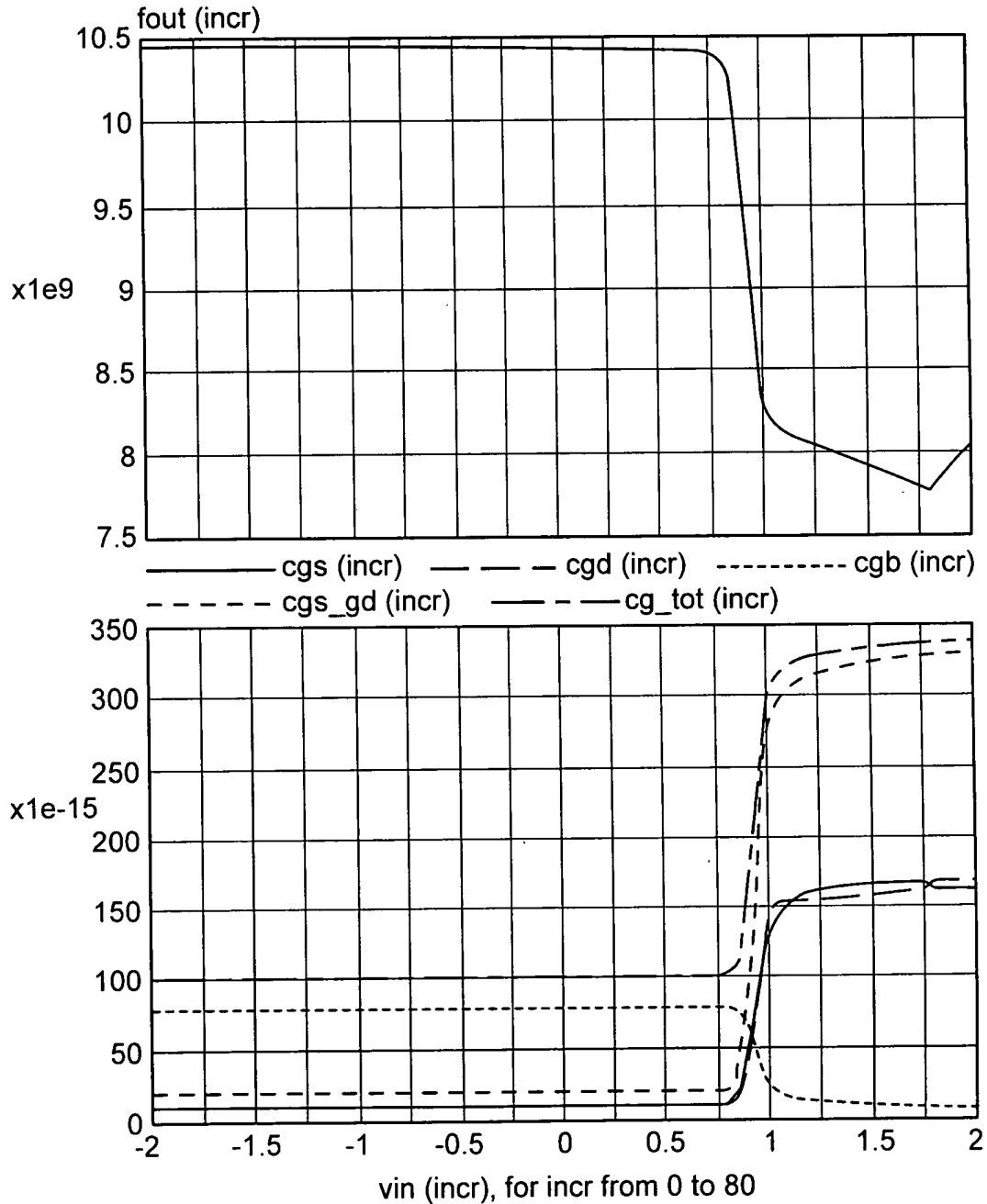


FIG. 7

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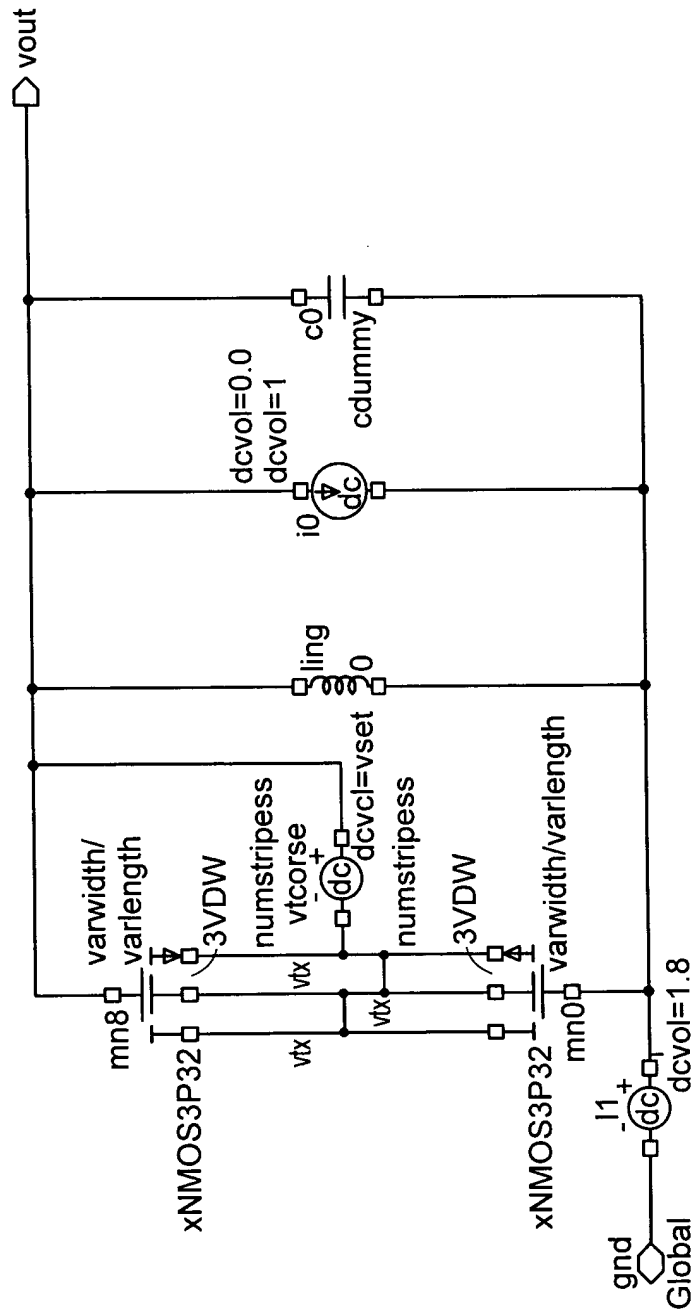


FIG. 8

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Calculate small swing tuning range, varactor Q, C(V) for D=S BG NMOS
 36.00Wx2. 00L, 4s, 1 NMOS varactor, ideal 0.36nH inductor tank

Process: nominal Temp: 25.0 deg C

Min Vtune: -2.00V Fc: 9.169 GHz VarQ: 163.8 Ztank: 3358.68 Ohms - 116 MHz/V
 Max Vtune: 0.45V Fc: 10.637 GHz VarQ: 758.6 Ztank: 18138.23 Ohms 351 Mhz/V
 Tuning Range: 1468.63 MHz 14.83 % about Favg: 9.903 GHz GainRatio: -0.3:1

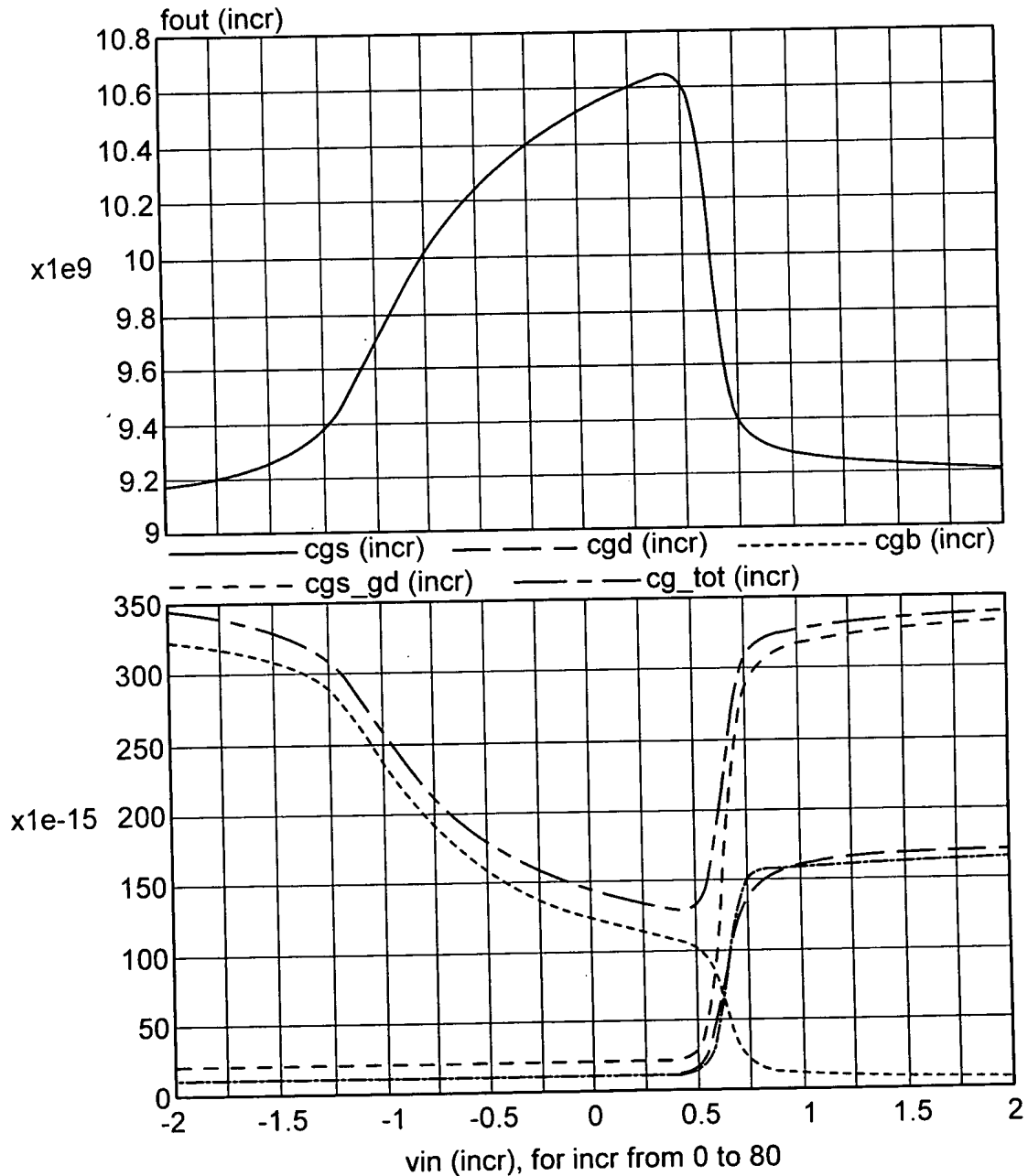


FIG. 9

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Calculate small swing tuning range, varactor Q, C(V) for D=S BG=0.5V NMOS
 36.00Wx2. 00L, 4s, 1 NMOS varactor, ideal 0.36nH inductor tank

Process: nominal Temp: 25.0 deg C

Min Vtune: 1.30V Fc: 7.926 GHz VarQ: 144.8 Ztank: 2567.42 Ohms -1271 MHz/V

Max Vtune: -2.00V Fc: 10.444 GHz VarQ: 199.6 Ztank: 4663.47 Ohms 11 Mhz/V

Tuning Range: 2518.65 MHz 27.42 % about Favg: 9.185 GHz GainRatio: -118.0:1

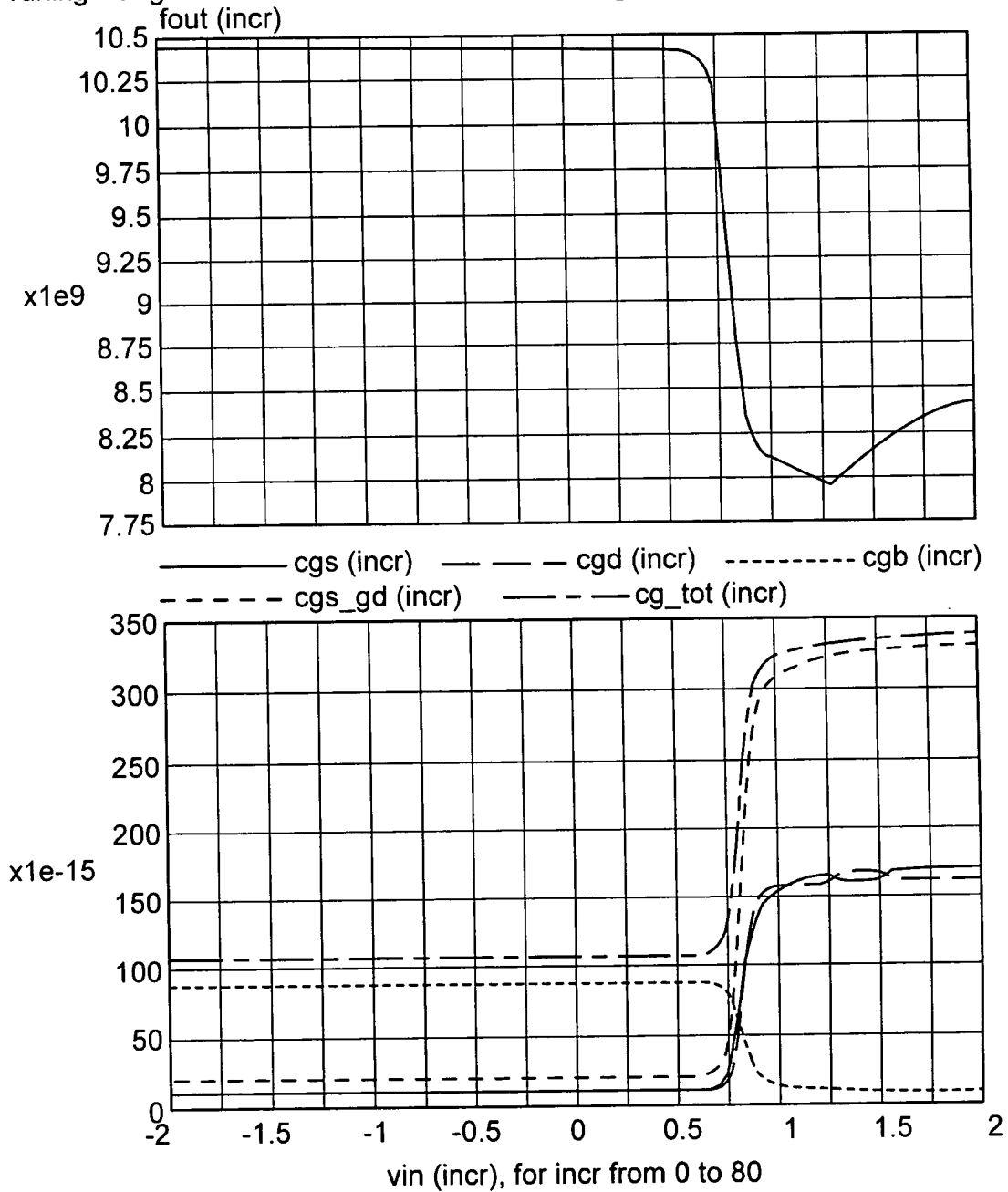
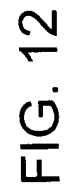


FIG. 11



Calculate small swing tuning range, varactor Q, C(V) for D=S BG=GND, I- NMOS
 36.00Wx2. 00L, 4s, 1 NMOS varactor, ideal 0.36nH inductor tank

Process: nominal Temp: 25.0 deg C

Min Vtune: 1.80V Fc: 9.211 GHz VarQ: 165.0 Ztank: 3400.90 Ohms 34 MHz/V

Max Vtune: -2.00V Fc: 11.124 GHz VarQ: 1006.6 Ztank: 25247.86 Ohms 2 Mhz/V

Tuning Range: 1912.92 MHz 18.81 % about Favg: 10.167 GHz GainRatio: 16.2:1

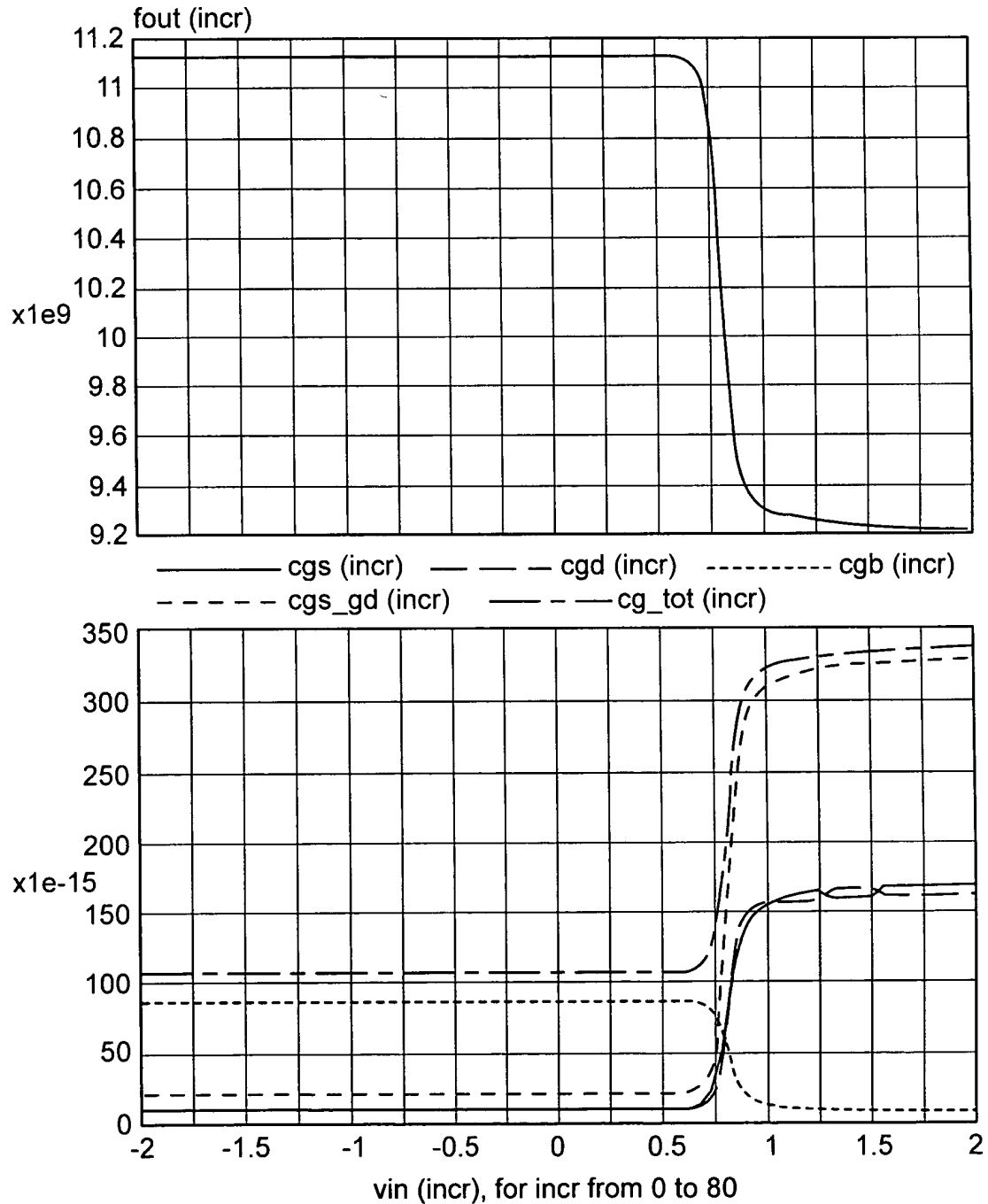


FIG. 13

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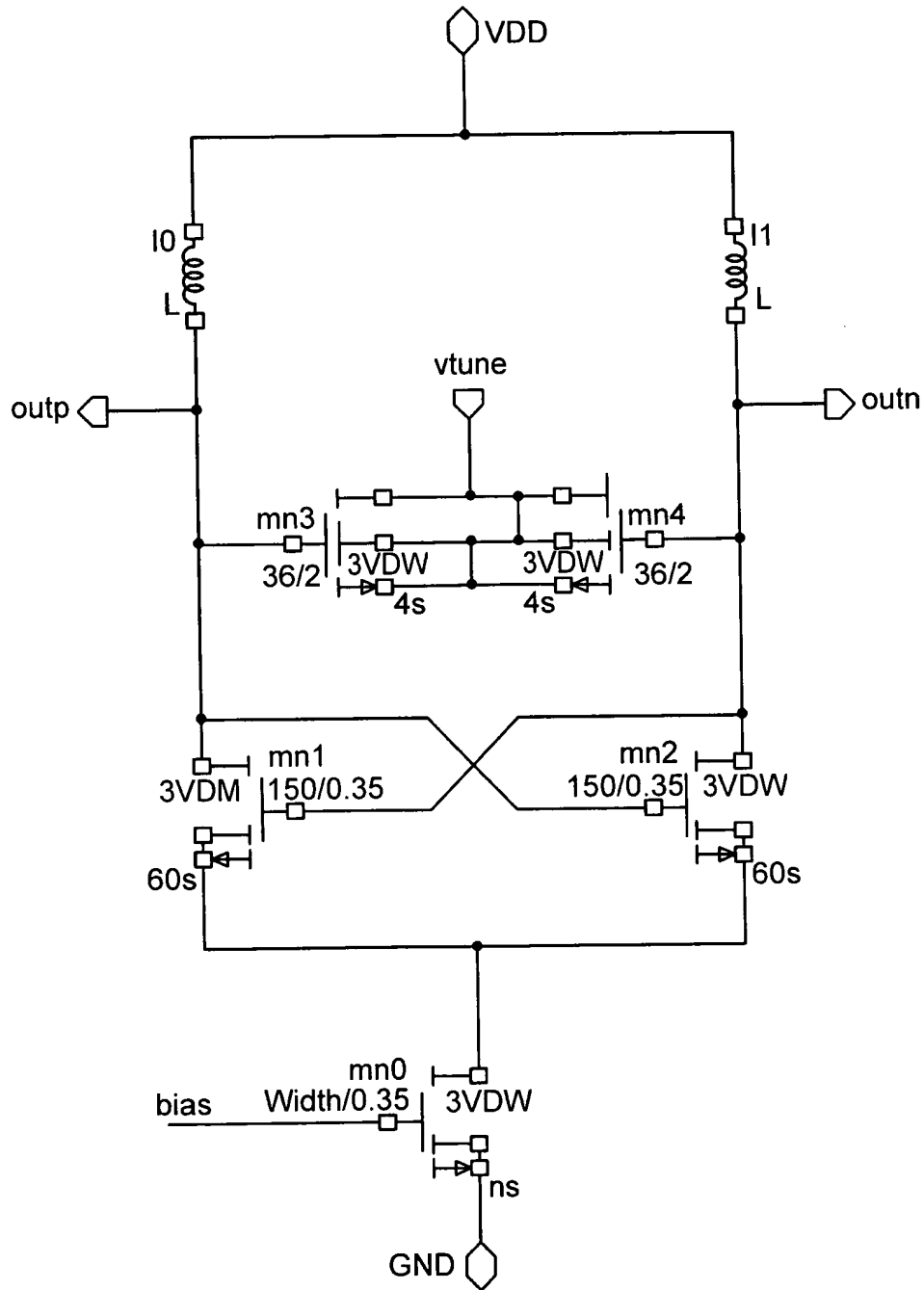


FIG. 15

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DVCO: 4 bit swcap Vrf0: 0.0 Vrf1: 1.2 Vrf2: 1.2 VCOsel0: 1.2 VCOsel1: 0.0
128.00Wx0. 13L, 32s, NMOS switch MIM cap, LSB, real 0.22nH inductor tank
Process: nominal Temp: 65.0 deg C Vdd: 1.8 Vtcorse: 0.9 Vtfine: 0.9
Min Fc: 9.166 GHz Max Fc: 9.328 GHz
Min Vppd: 2.677 V Max Vppd: 2.694 V
BW: 0.16 GHz (1.74%) Isb: 10.07 MHz CPU: unix Time: 71446.5 secs RELTOL: 1e-06

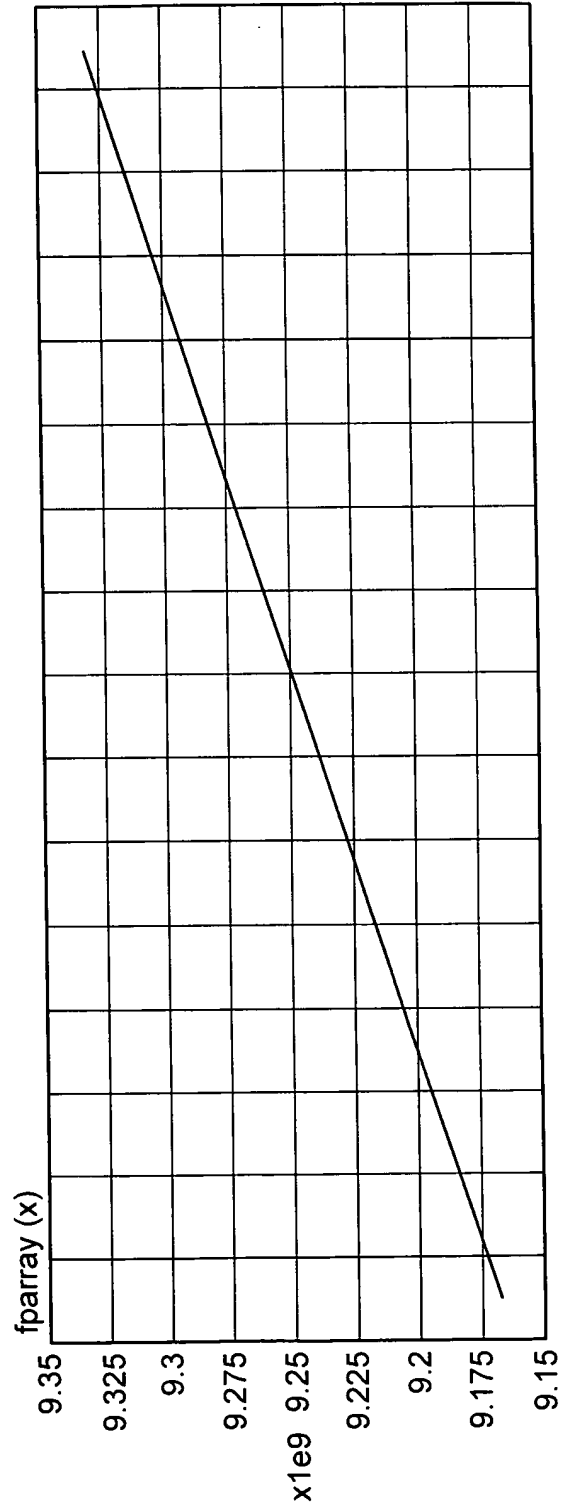


FIG. 17

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DVCO: 4 bit swcap Vrf0: 0.0 Vrf1: 1.2 Vrf2: 1.2 VCOsel0: 1.2 VCOsel1: 0.0
 128.00Wx0. 13L, 32s, NMOS switch MIM cap, LSB, real 0.22nH inductor tank
 Process: nominal Temp: 65.0 deg C Vdd: 1.8 Vtcorse: 0.9 Vtfine: 0.9
 Min Fc: 8.825 GHz Max Fc: 8.828 GHz
 Min Vppd: 2.715 V Max Vppd: 2.725 V
 BW: 0.00 GHz (0.04%) lsb: 0.23 MHz CPU: unix Time: 68843.7 secs RELTOL: 1e-06

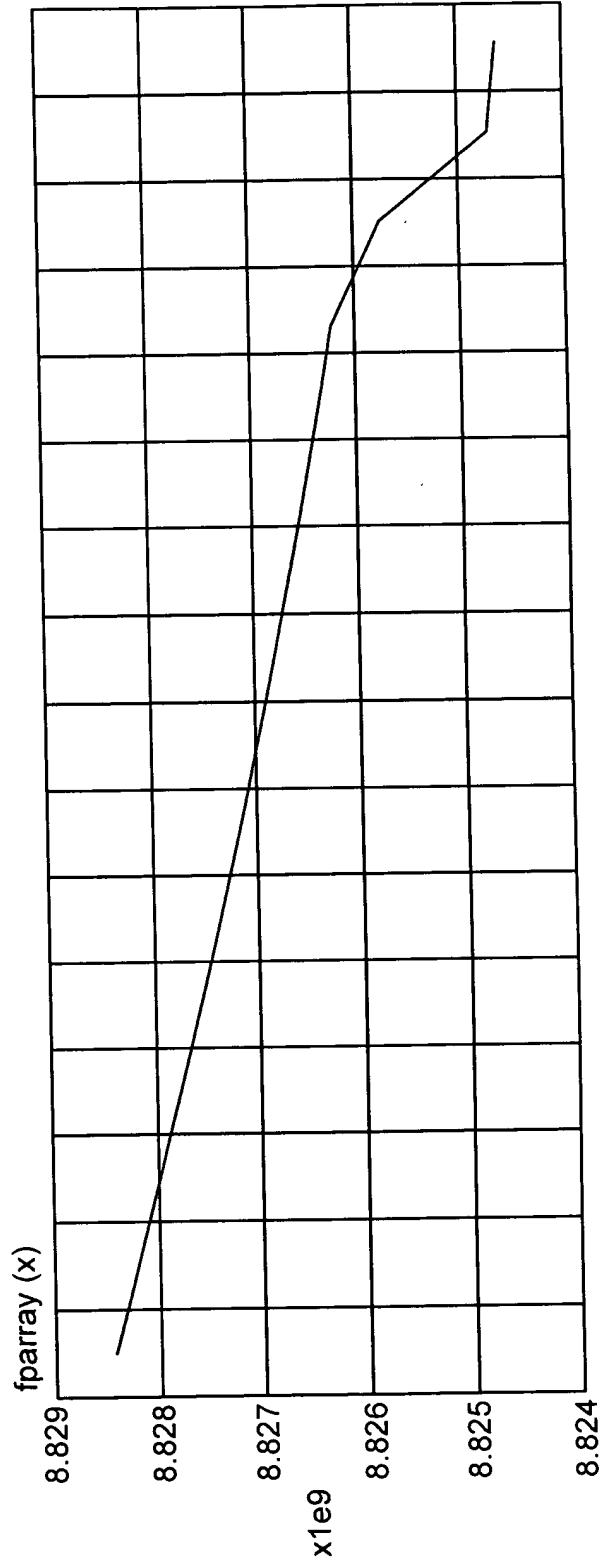


FIG. 18

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DVCO: 4 bit swcap Vrf0: 0.0 Vrf1: 1.2 Vrf2: 1.2 VCOsel0: 1.2 VCOsel1: 0.0
 128.00Wx0.13L, 32s, NMOS switch MIM cap, LSB, real 0.22nH inductor tank
 Process: nominal Temp: 65.0 deg C Vdd: 1.8 Vtcorse: 0.9 Vtfine: 0.9
 Min Fc: 8.838 GHz Max Fc: 8.840 GHz
 Min Vppd: 2.712 V Max Vppd: 2.726 V
 BW: 0.00 GHz (0.02%) Isb: 0.11 MHz CPU: unix Time: 70891.4 secs RELTOL: 1e-06

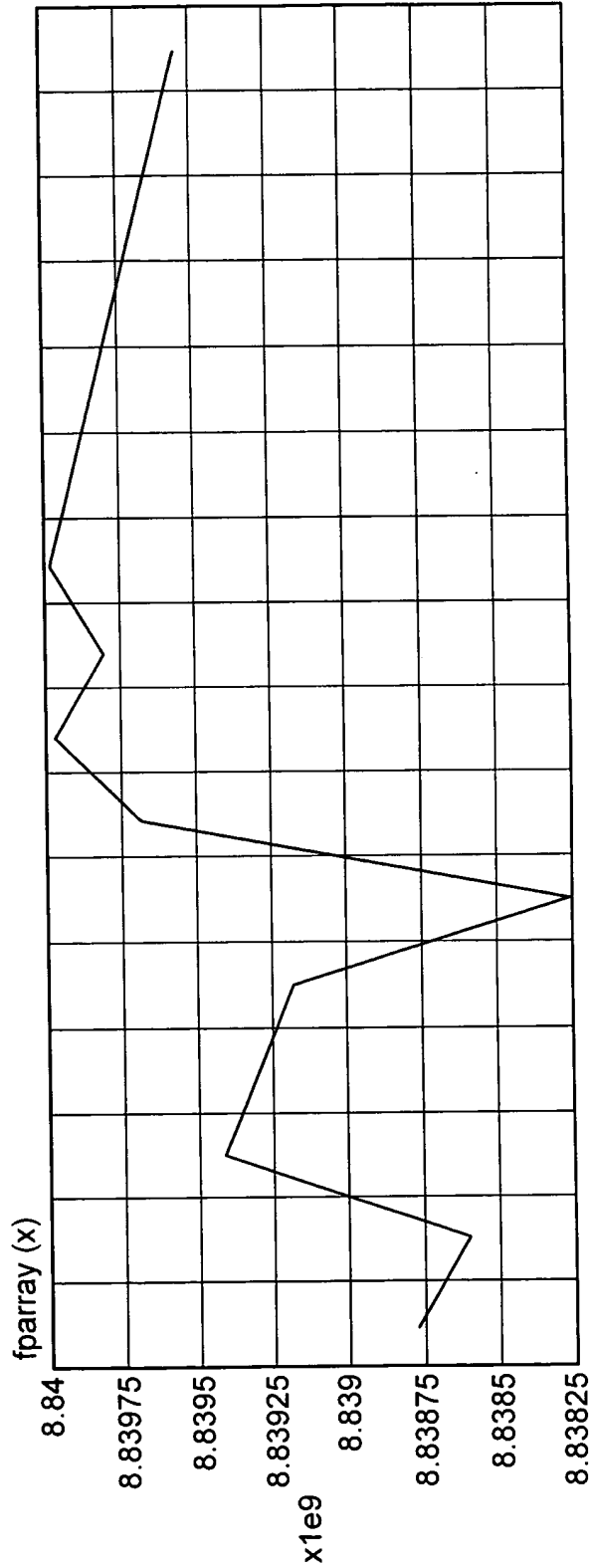


FIG. 19

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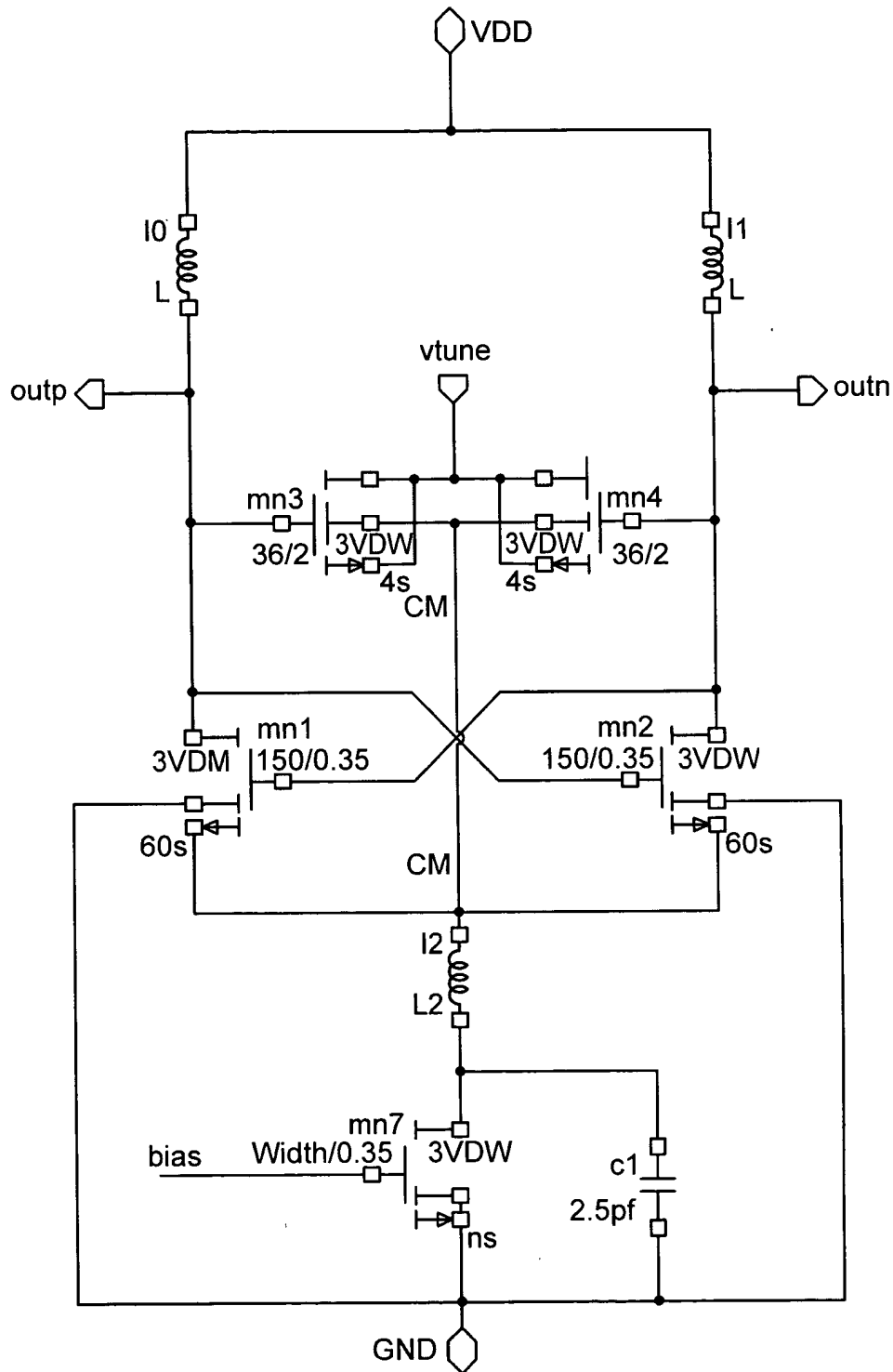


FIG. 20

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DVCO: 4 bit swcap Vrf0: 0.0 Vrf1: 1.2 Vrf2: 1.2 VCOsel0: 1.2 VCOsel1: 0.0
 128.00Wx0.13L, 32s, NMOS switch MIM cap, LSB, real 0.22nH inductor tank
 Process: nominal Temp: 65.0 deg C Vdd: 1.8 Vtcorse: 0.9 Vtfine: 0.9
 Min Fc: 8.956 GHz Max Fc: 9.004 GHz
 Min Vppd: 2.568 V Max Vppd: 2.582 V
 BW: 0.05 GHz (0.53%) Isb: 2.98 MHz CPU: unix Time: 71968.6 secs RELTOL: 1e-06

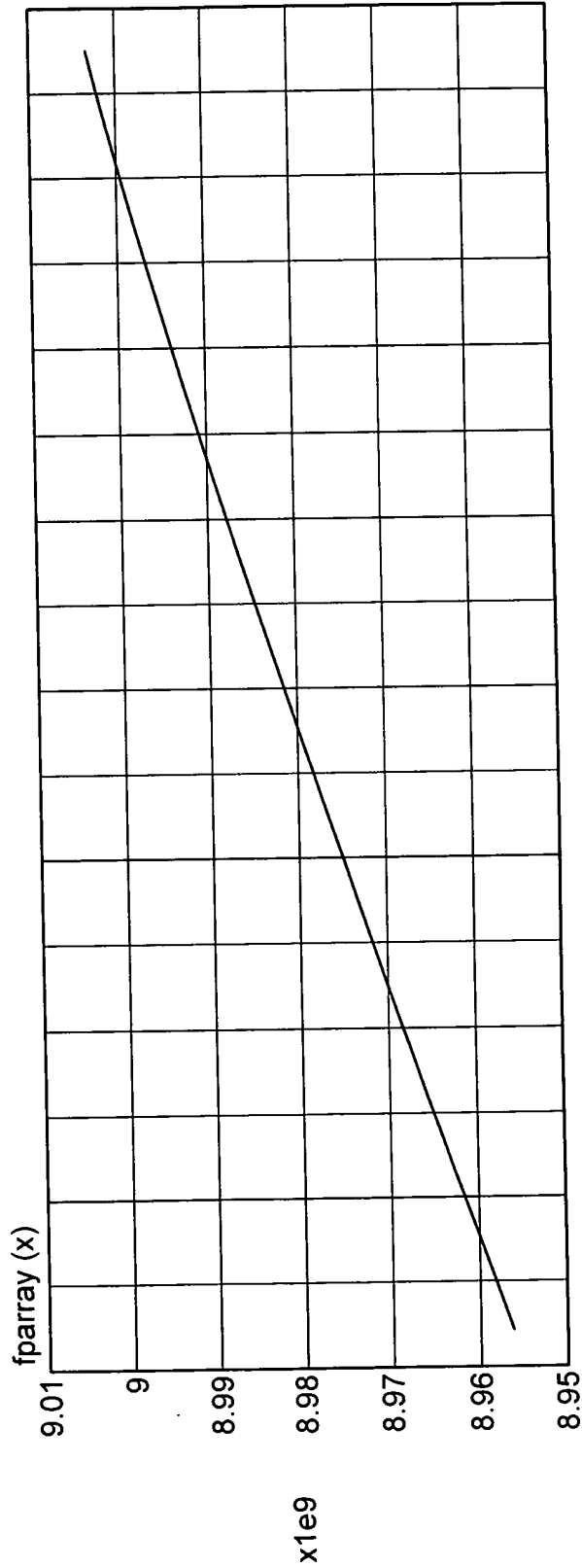


FIG. 21